



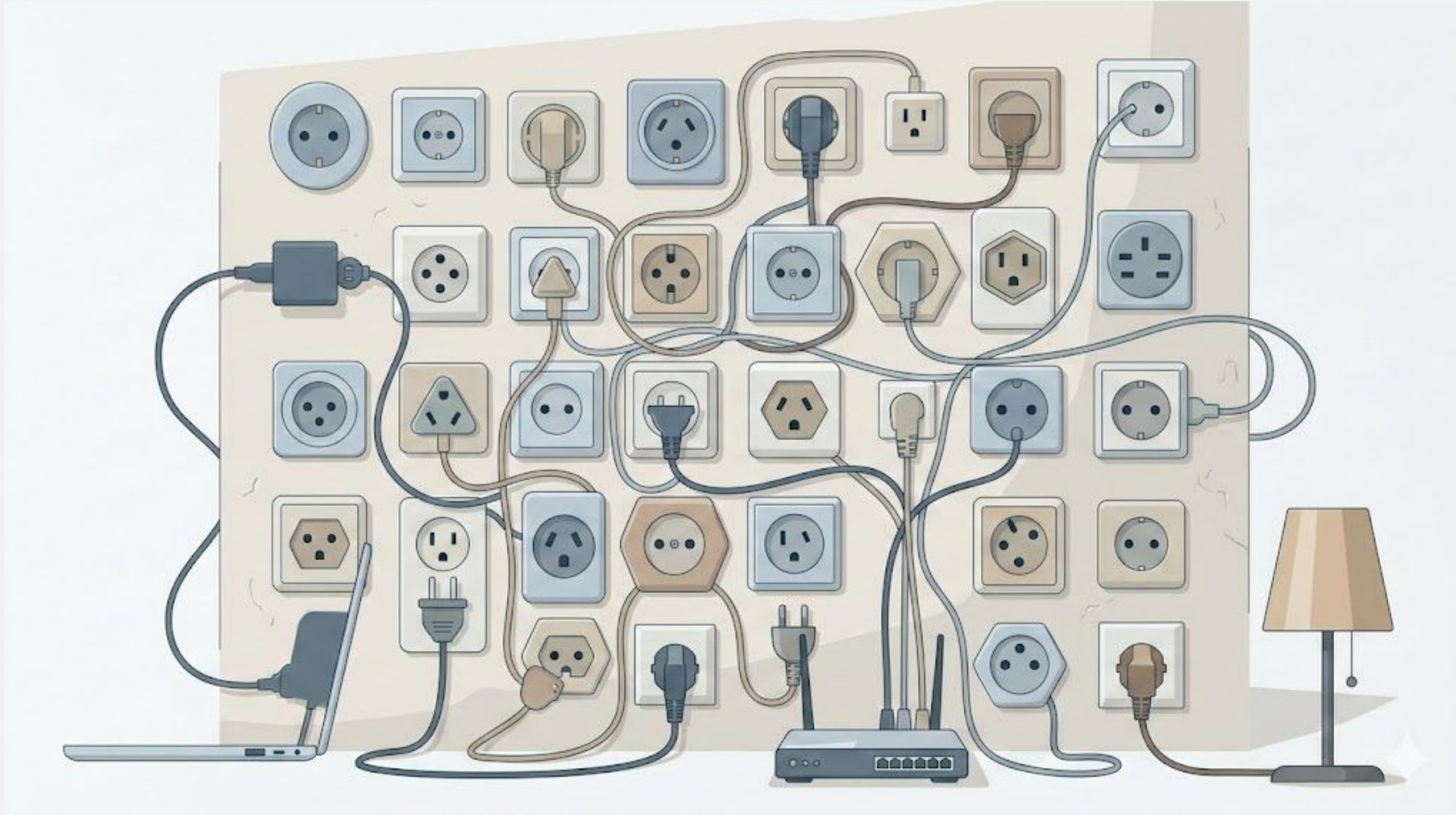
How it works: The Internet Engineering Task Force (IETF)



Making the Internet work better

9th March 2026

Standards Why?



IETF What?



Develop Protocols

The IETF designs **Internet protocols** — the technical rules that allow independent networks and systems to **interoperate** globally.



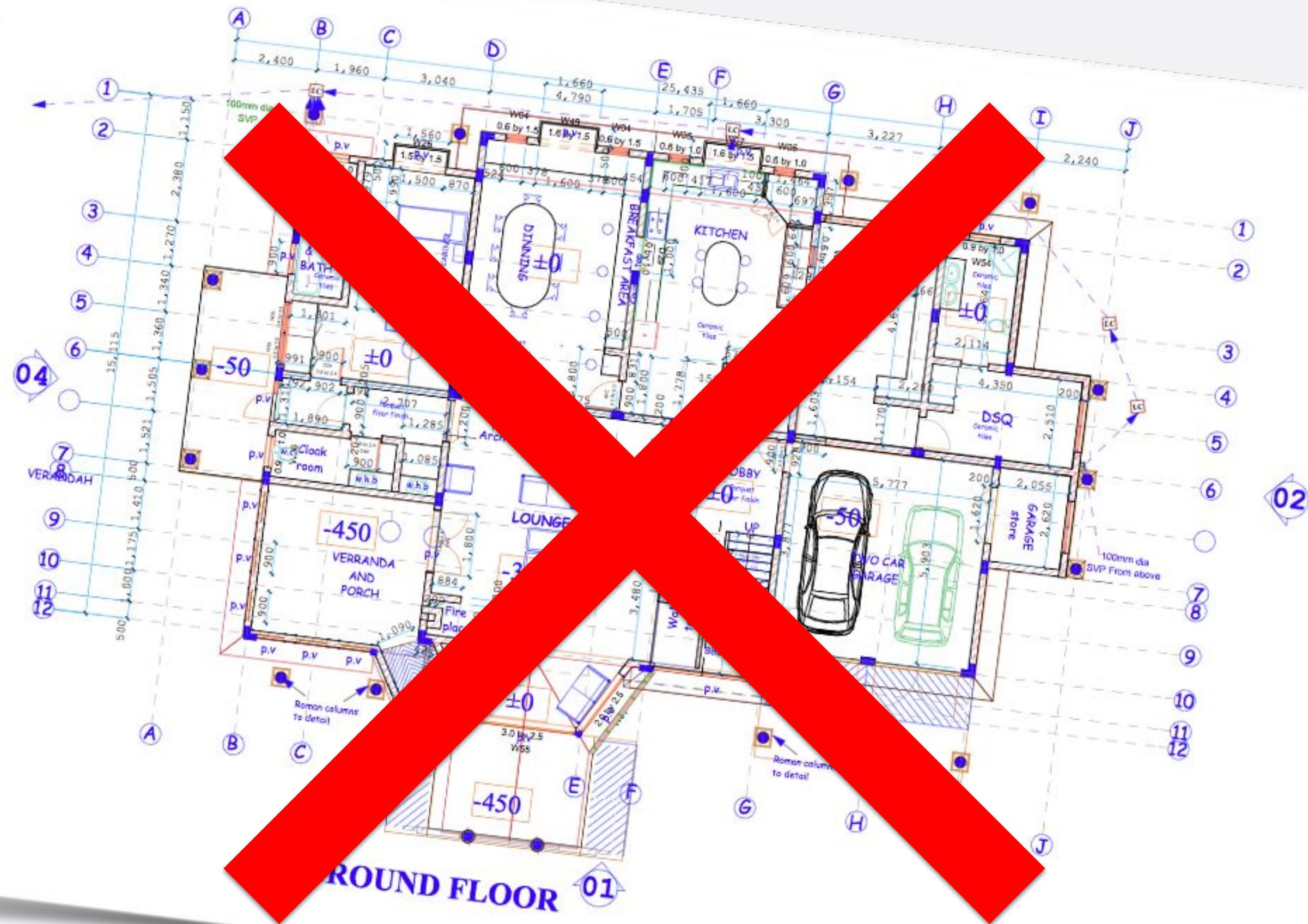
Build Consensus

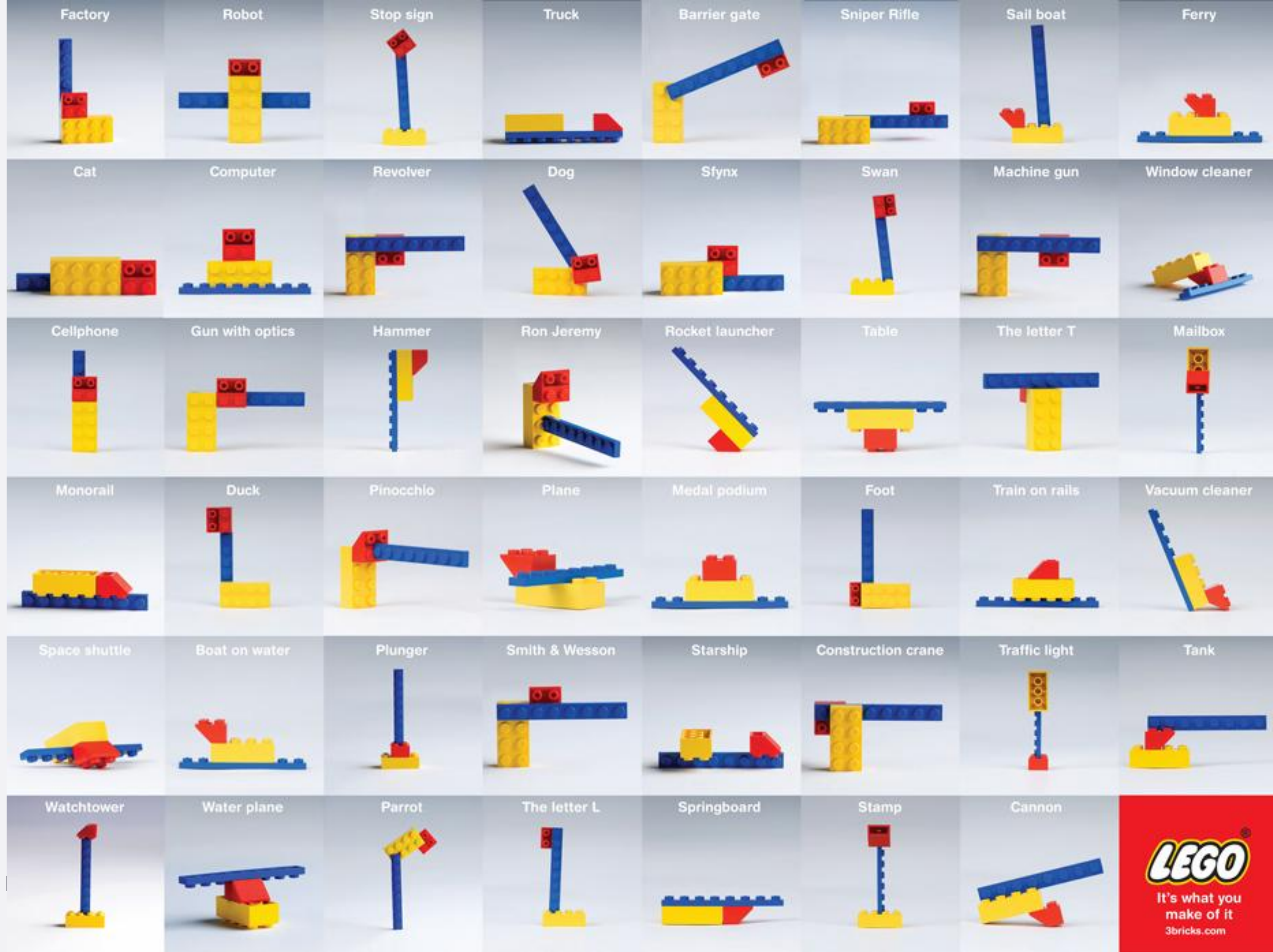
Through open discussion and **rough consensus** — not voting or top-down control, just technical merit!



Publish RFCs

Request for Comments — publicly available free archival documents that define Internet Standards and best practices.





Make the Internet work better by producing high quality, relevant technical documents that influence the way people design, use, and manage the Internet.

[RFC 3935]



Everyone participates as an individual



We don't have **Members**



Specifications provide **“building blocks”**



All work is available for **free**



Judge contributions on **technical merits**

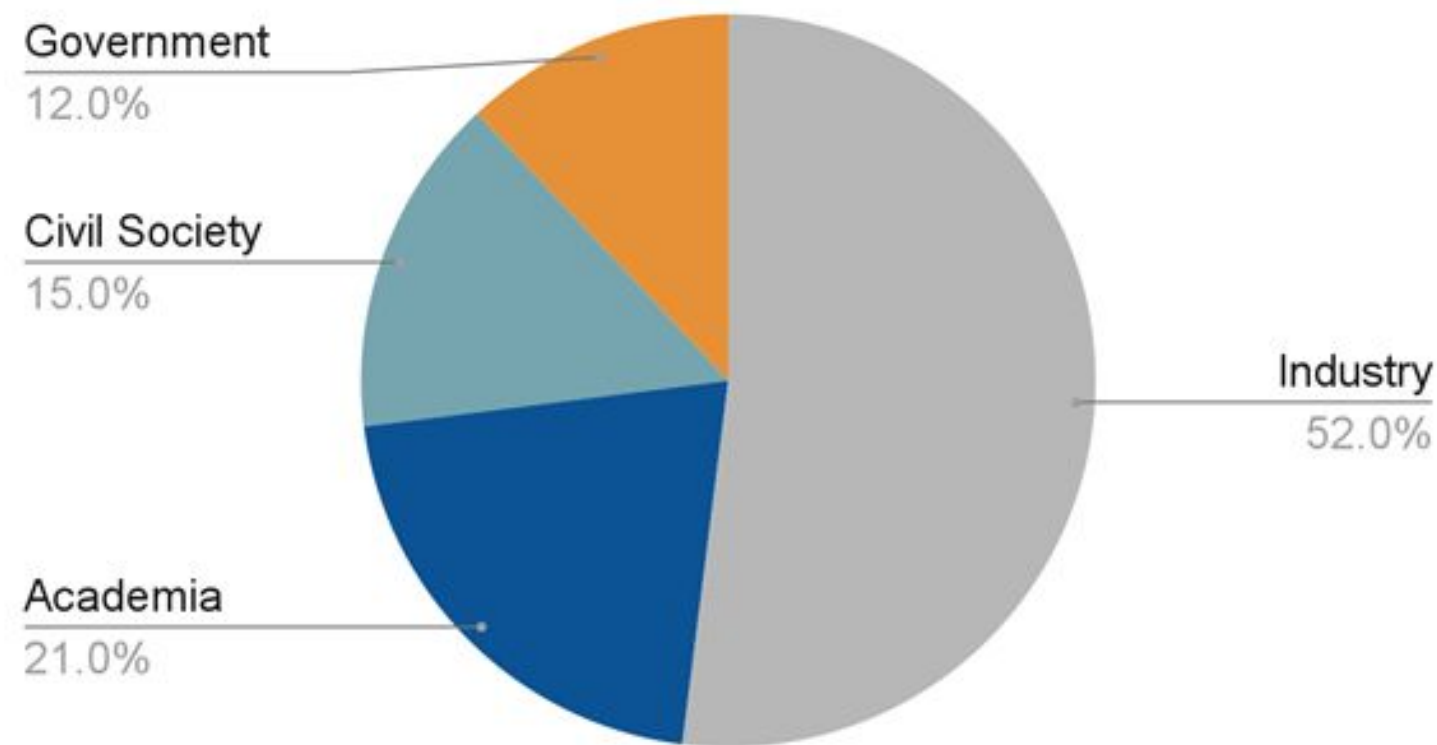


Determine success by **voluntary deployment**

Standardization with multi-stakeholder participation

The IETF draws individuals from industry, academia, civil society and governments

Community Participation



77

Countries of the participants
in the 2024 plenary meetings

*Everyone
participates as an
individual*

All communities have equal
standing in the IETF
processes

Tailored engagement programs for new participants, starting new work, policy makers and open source software communities

Flexible approaches to contribution

All IETF meetings are remote-only or hybrid

35 - 45%

of plenary meetings participants
that are remote

~40%

of working groups meet during the
year in remote-only sessions



Same meeting participation tool
for on-site and remote

All key working group decisions
confirmed via email

I E T F[®]
Datatracker

All work in progress, final
specifications, and meeting
materials, recordings are
available free

<https://datatracker.ietf.org>

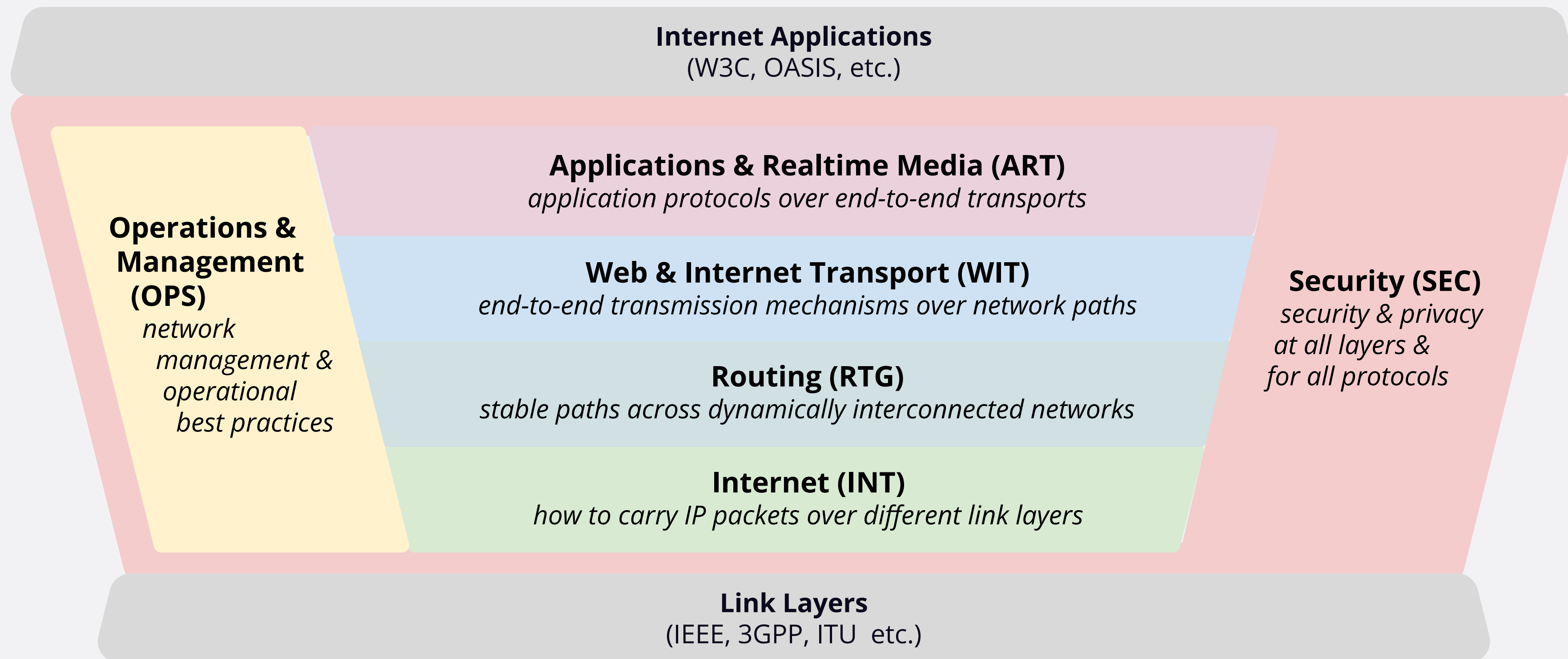
IETF RFCs

The “building blocks” of the Internet

- Defining how the Internet works
 - **DNS** for naming [RFC1034](#), [RFC1035](#)
 - **HTTP** for Web [RFC9110](#)
 - **SMTP** (and more) for e-mail [RFC5321](#)
 - **TLS** for encrypted connections [RFC8446](#)
 - **TCP** and **QUIC** for connectivity [RFC9293](#), [RFC9000](#)
 - **IP** for networking [RFC791](#), [RFC8200](#) (IPv6)
 - **BGP** for routing [RFC4171](#)
- A document series that is
 - **Free** and **publicly available**
 - Produced in a **fair, open process**
 - Published under a **comprehensive, mature IPR policy**
 - **Stable** over time
 - **Widely respected** and known
 - **Maintained** and **evolved** by an active global community that includes engineers, users, industry, civil society, and government actors

IETF

Areas of Work



Work Areas and Key Protocols

Internet Applications
(W3C, OASIS, etc.)

Operations & Management (OPS)

network
management &
operational
best practices

YANG
NETCONF
SNMP
RADIUS
DNSOPS

Applications & Realtime Media (ART)

application protocols over end-to-end transports, voice & video, SIP, RTP, email

Web and Internet Transport (WIT)

end-to-end transmission mechanisms over network paths, HTTP
TCP, UDP, QUIC, congestion control

Routing (RTG)

stable paths across dynamically interconnected networks
BGP, OSPF, IS-IS, MPLS, RSVP, VPNs, SFC, multicast

Internet (INT)

how to carry IP packets over different link layers
IPv6, IPv4, DHCP, NTP, mobility, multihoming

Security (SEC)

security & privacy
at all layers &
for all protocols

TLS
IPsec
PGP
S/MIME
PKIX
cryptography

Link Layers
(IEEE, 3GPP, etc.)

All the Working Groups

The IETF loves acronyms

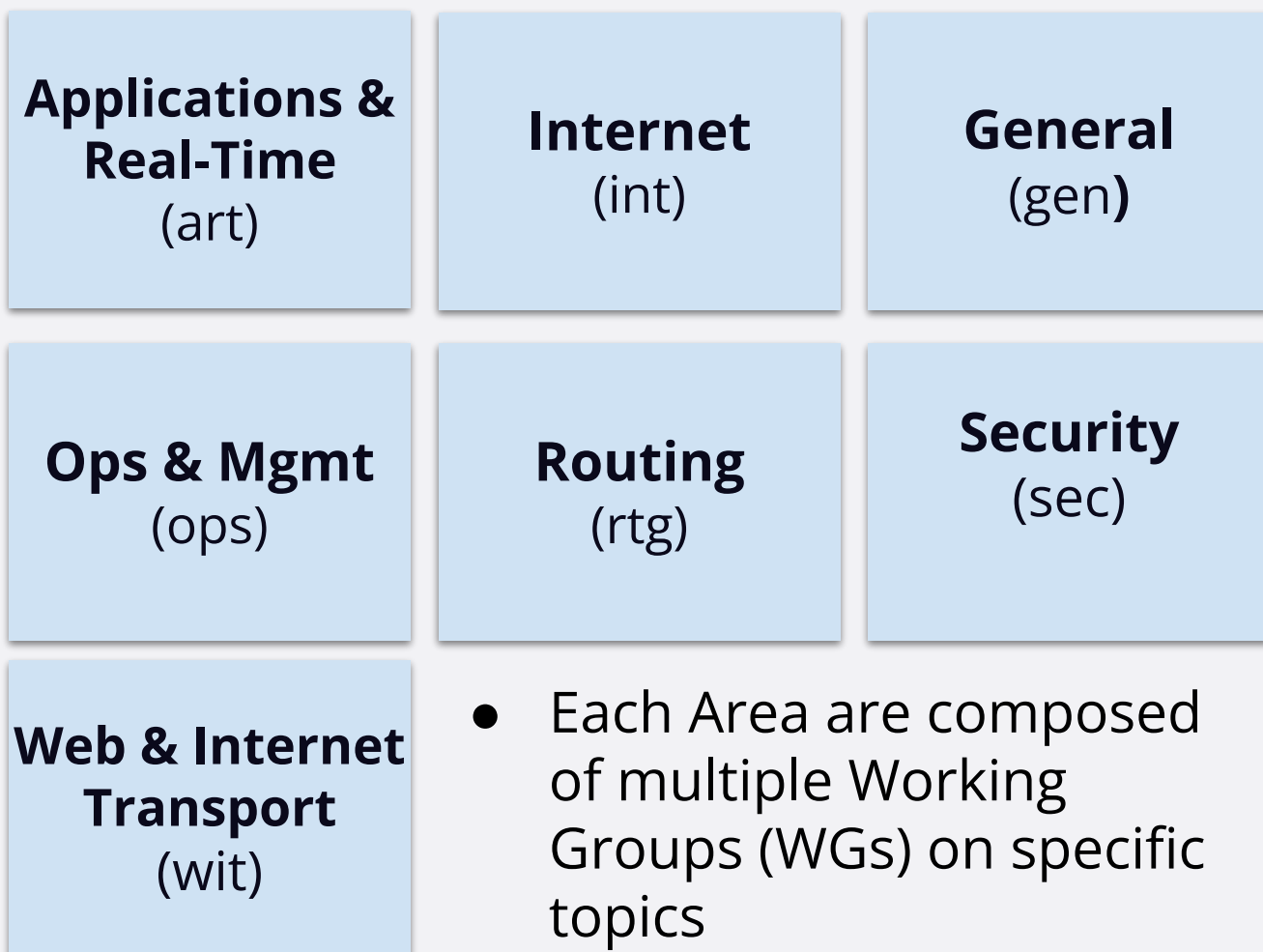
ART		GEN	INT	OPS	RTG		SEC		WIT
asap asdf calext cbor cellar dconn diem dispatch dkim dmarc ecrit emailcore jmap mailmaint mediaman mimi mlcodec ocm regex	rpp satp sipcore sml stir vcon wimse	gendispatch ianabis modpod procon	6lo 6man add bpf deleg dhc dmm dnssd drip dtn intarea ntp schc snac tiptop	anima bmwg dnsop green grow iotops ippm ivy mboned mops netconf netmod nmop opsawg sidrops srv6ops v6ops	bess bfd bier cats ccamp detnet idr lisp lsr lsvr manet mpls nvo3 pce pim rift roll	rtgwg savnet spring teas tvr	ace acme cose dance dult emu hpke ipsecme jose keytrans kitten lake lamps mls oauth ohai openpgp ppm pquip	privacy pass radext rats scim scitt seat secdispatch spice sshm suit teep tls uta	aipref avtcore ccwg cdni core happy httpapi httpbis masque moq nfsv4 quic scone tcpm tsvwg webbotauth webtrans wish

IETF

Key Organizational Elements

Standards

IETF standards are organized into Areas



- Each Area are composed of multiple Working Groups (WGs) on specific topics
- **~125** active WGs

Architecture and Outreach

Internet Architecture Board (**IAB**) provides:

- Long-range technical direction for Internet development
- Pre-standardization workshops
- Liaison coordination
- Outreach

The **IETF Administration LLC** provides the corporate legal home of all the IETF activities

The **IETF Intellectual Property Management Corporation (IPMC)** holds and manages the rights to IETF contributions

Research

Internet Research Task Force (**IRTF**) conducts research on the evolution of the Internet protocols, applications, architecture and technology.

- Long-term exploration ahead of standardization activities
- Organized into ~16 active Research Groups (RGs)

IETF

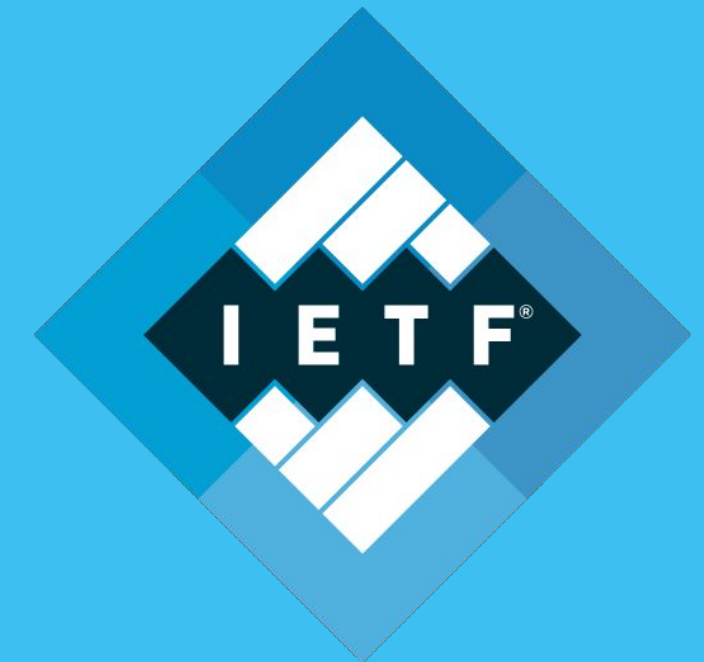
Document Types

Internet-Draft (I-D)

- Active **working documents**
 - *Not finalized and not stable*
- **Anyone can submit an I-D**
 - *draft-yourname-...*
- Only **some I-Ds are Working Group documents**
 - *draft-ietf-wgname-...*

RFC (Request For Comments)

- **Archival** publication series
 - RFCs never change once published
- **Not all RFCs are standards**
 - Also: Informational, Experimental
- **Not all RFCs are IETF documents**
 - Also Internet Architecture Board (IAB), Internet Research Task Force (IRTF), others



We believe in:
Rough consensus
and running code

David Clark, 1992

Some Trivia

What came first?

IETF
RFCs
Around the
same time!

How many RFCs?

<1000
~5000
~10000
>15000

How does IETF make decision?

Majority vote
Board-
Resolution
Rough-
Consensus

Some Trivia

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Board-Resolution
Rough-Consensus

IETF & RFCs

Some History

IETF	RFC Series
● Formed in 1986 ○ by the then <i>Internet Activities Board</i> ● First IETF meeting was attended by 21 US federal government-funded researchers on 16 January 1986 ○ some of them still participate!	● RFC 1 published in 1969 ● Now approaching RFC 10000. ● For initial 28 years, managed and edited by the Internet pioneer <i>Jon Postel</i>. ● Now RFC Editor and RFC Production Center!

“

We reject: kings,
presidents, and voting.
We believe in: rough
consensus and running
code.

”

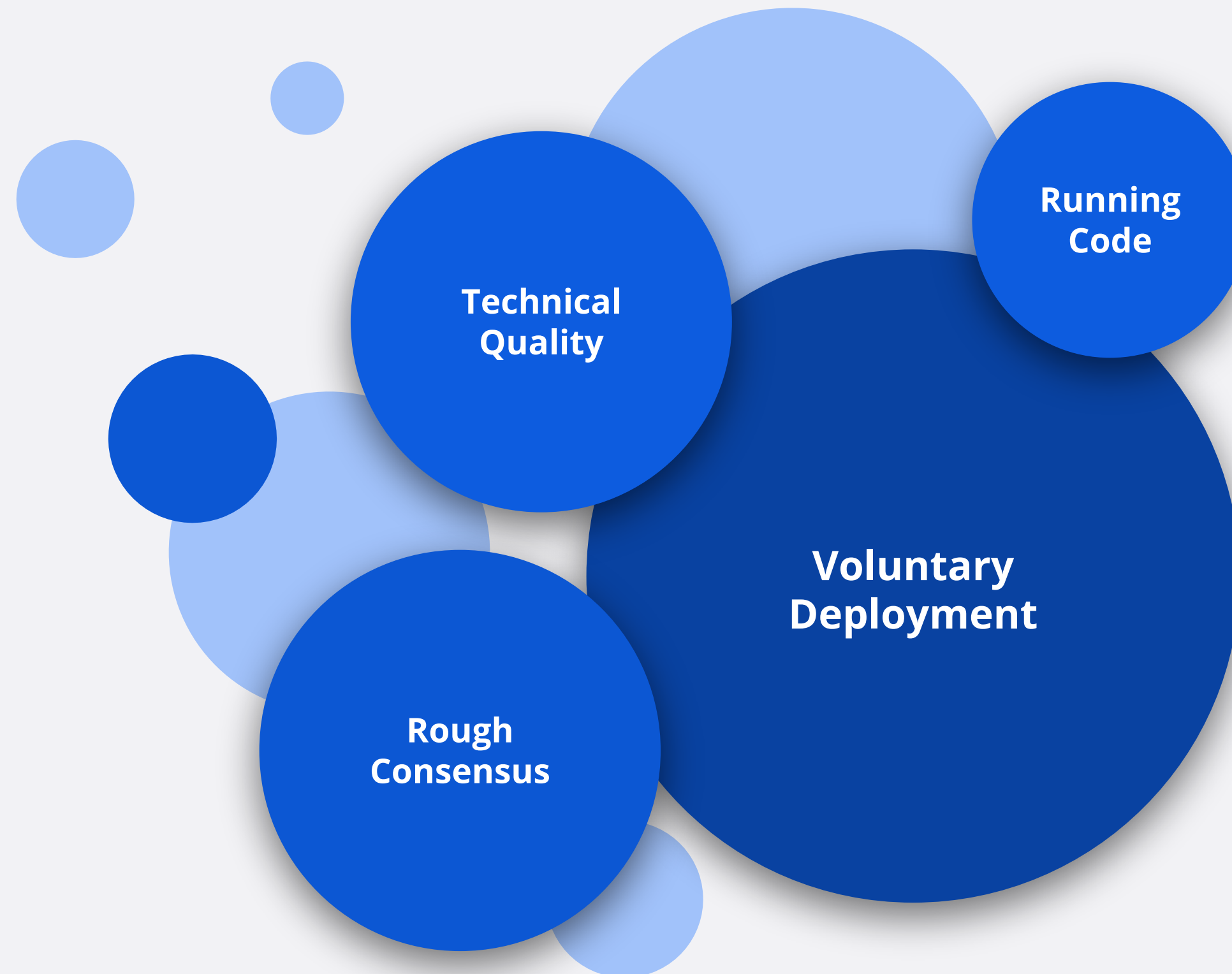
David Clark (1992)

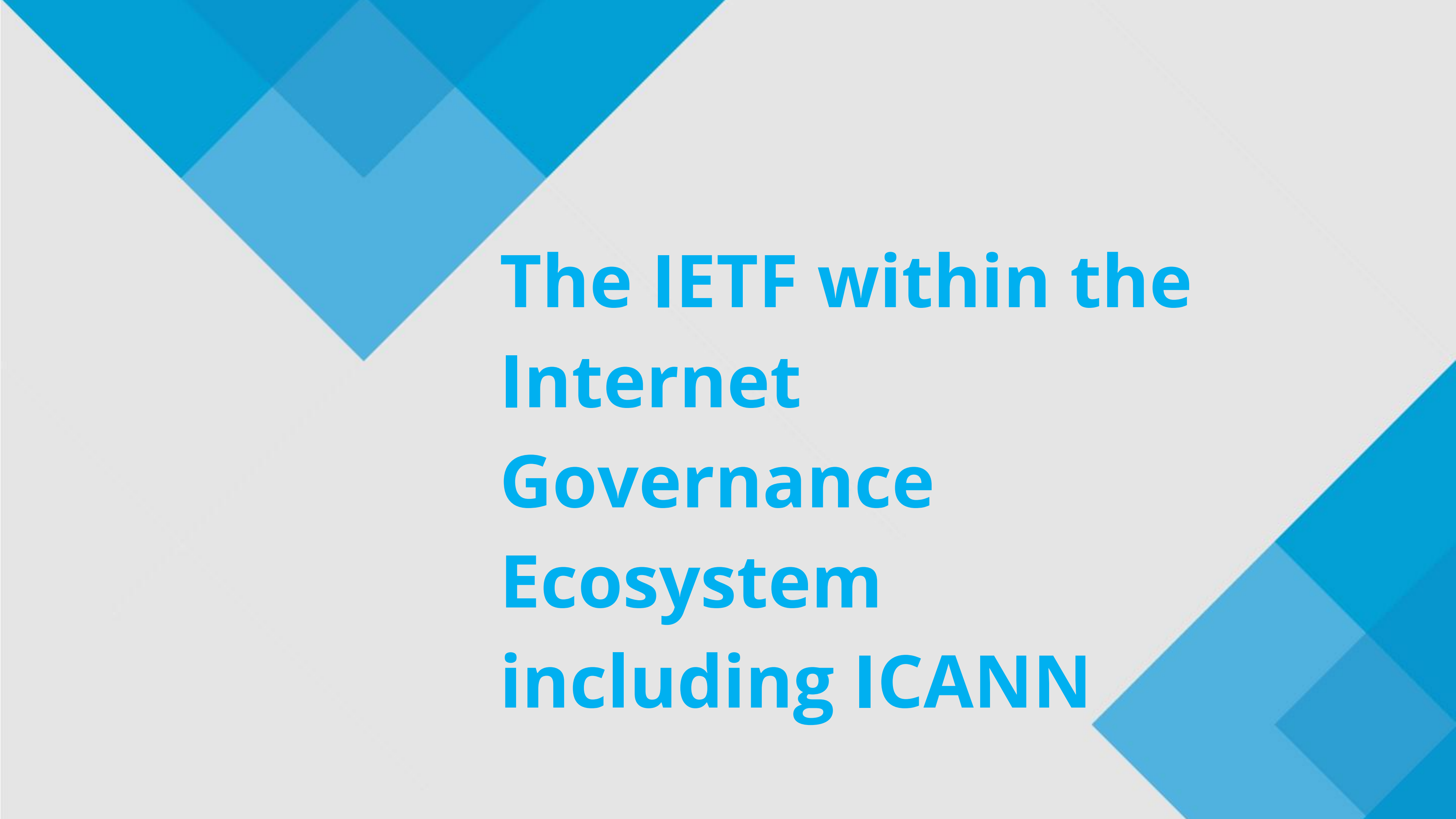
IETF

Rough Consensus

- Achieved when all issues are addressed, but not necessarily accommodated
- Lack of disagreement is more important than agreement
- Humming [and polling] should be the start of a conversation, not the end
- Technical reasoning matter, not +1 counting emails
- Reference: [RFC7282](#) "On consensus and Humming in the IETF"

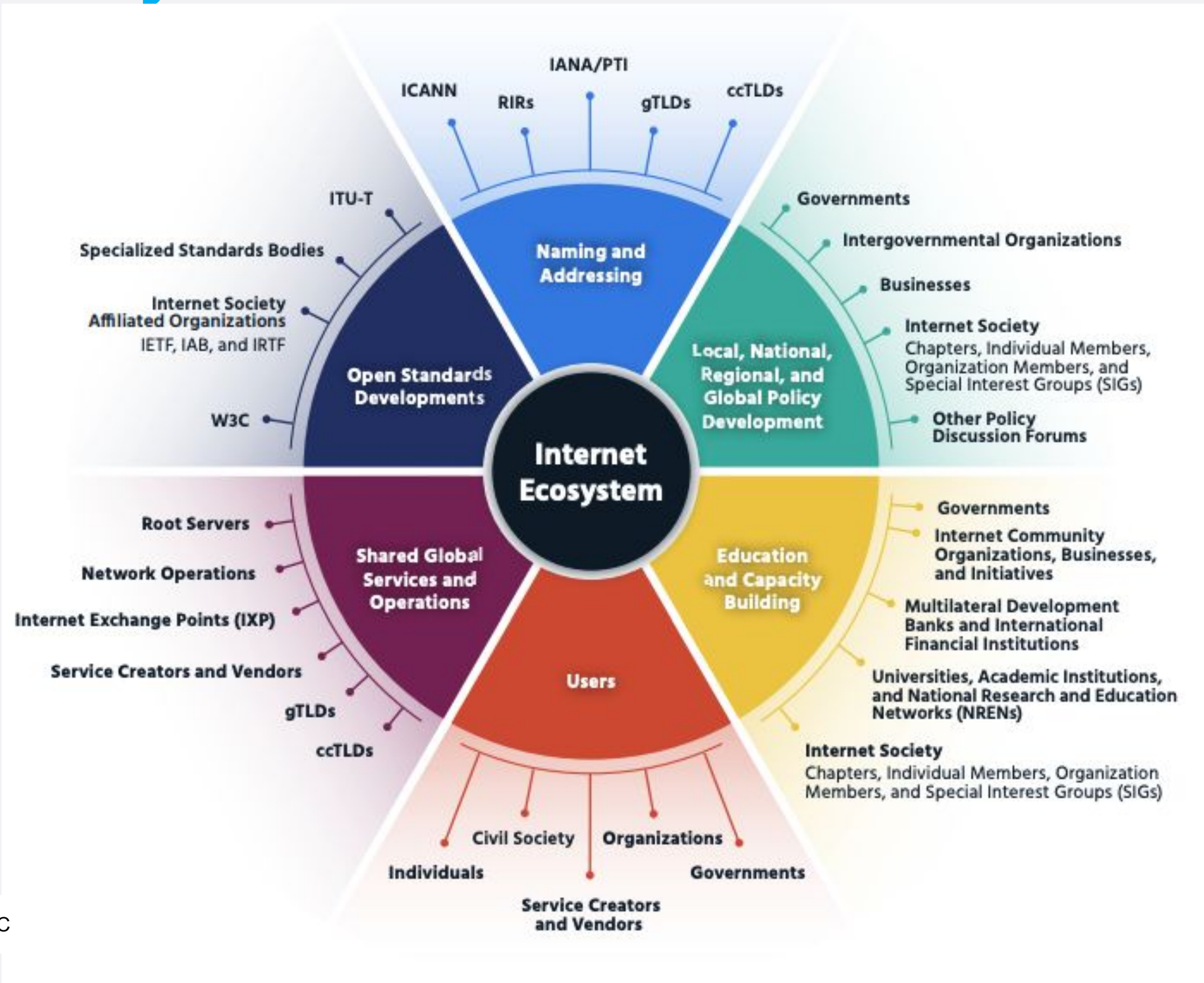
What makes an IETF standard successful?





The IETF within the Internet Governance Ecosystem including ICANN

Internet Ecosystem



Partners in the Internet Technical Community

Providing expertise that helps maintain Internet infrastructure, protocols, and reliable operation

Names



+

Numbers



+

Protocols



Multistakeholder Model

Characteristics



IETF

Relationship with ICANN

- **ICANN** and the **IETF** were coupled from the start, with each creating work that the other depends on
- ICANN's original 1998 bylaws included the **Protocol Supporting Organization** (PSO), which included the IETF
- A Memorandum of Understanding established an IANA Liaison to the IETF in **March 2000**
- The **December 2002** bylaws update:
 - eliminated the PSO, and
 - created non-voting liaison seats on the ICANN Board, including for the IETF
- The IETF Liaison provides a channel to discuss issues that have both **technical** and **policy** implications
- **Technical community members** regularly participate in both organizations:
 - IETFers in the SSAC, RSSAC, at Tech Days and DNSSEC Workshops
 - ICANN technical staff as IETF document authors and research contributors

Selection of ICANN staff-authored RFCs

- [RFC8949 - "Concise Binary Object Representation \(CBOR\)"](#)
- [RFC8909 - "Registry Data Escrow Specification"](#)
- [RFC8914 - "Extended DNS Errors"](#)
- [RFC8806 - "Running a Root Server Local to a Resolver"](#)
- [RFC8748 - "Registry Fee Extension for the Extensible Provisioning Protocol \(EPP\)"](#)
- [RFC8499 - "DNS Terminology"](#)
- [RFC8484 - "DNS Queries over HTTPS \(DoH\)"](#)
- [RFC8145 - "Signaling Trust Anchor Knowledge in DNS Security Extensions \(DNSSEC\)"](#)
- [RFC8109 - "Initializing a DNS Resolver with Priming Queries"](#)
- [RFC7958 - "DNSSEC Trust Anchor Publication for the Root Zone"](#)

IETF

Relationship with ICANN

Liaisons and Appointments

- IETF Liaison to ICANN Board – *David Lawrence*
- Root Zone Evolution Review Committee (RZERC) – *Willem Toorop*
- ICANN Nominating Committee (NomCom) Delegate – *Pete Resnick*
- Technical Liaison Group (TLG) – *Warren Kumari, Petr Špaček*
- Root Server System (RSS) Governance Working Group (GWG) – *Geoff Huston, Jim Reid*
- Root Server System Advisory Committee (RSSAC) – *Daniel Migault*

IANA Function

- *ICANN operates the IANA protocol registries for the IETF under IAB oversight.*
- *Many, many IETF standards need IANA updates*
- *A key component of avoiding collisions and confusion*

Several individuals have contributed to both the IETF and ICANN communities, strengthening coordination and mutual understanding.

- Examples include: *Wes Hardaker, Suzanne Woolf, Jim Galvin, Paul Hoffman, Patrik Fältström, Barry Leiba, Steve Crocker, Geoff Huston, John Klensin, Matt Larson, and many others.*

IETF

Relationship with ICANN

- Key areas for IETF / ICANN interaction:
 - Internationalized domain names
 - Special-purpose domains (.local, .onion, .internal, .home, .arpa, ...)
 - DNS security & operations
 - Registry/Registrar communications (EPP, RDAP,...)
 - IANA
- The IETF is not a policy-making body, but its technologies have policy implications.
- We welcome discussions with policy-making bodies, both informally and formally.

The background features a light gray color with decorative blue geometric shapes in the corners. In the top-left corner, there is a large blue triangle pointing downwards, composed of several overlapping, semi-transparent layers. A similar, but smaller, blue triangle is located in the bottom-right corner, also pointing downwards and composed of overlapping layers. The text is centered in the middle of the slide.

Recent & Ongoing Work

IETF 125

March 14-20, Shenzhen



** Fee waiver for Remote Participation are easily available...*

IETF

New work

Newly formed Working Groups:

- [Secure Evidence and Attestation Transport](#) (SEAT)
- [Domain Connection](#) (DCONN)
- [Open Cloud Mesh](#) (OCM)
- [Web Bot Auth](#) (WEBBOTAUTH)
- [PKI, Logs, And Tree Signatures](#) (PLANTS)

In process of chartering:

- [Authenticated Transfer](#) (ATP)

IETF 125

New work

Birds of a Feather (BoFs) approved for IETF 125

- [Coordinating Agent To Agent List of efforts](#) (CATALIST)
 - An effort to coordinate the various initiatives to develop IETF work on AI agent-to-agent communications.
- [Operationalizing Network & Service abstractionNs](#) (ONSEN)
 - Enable operators to manage and automate service abstractions in a consistent manner based on inputs from the [IAB NEMOPS](#) workshop.

IETF DNS Updates

- Recent [DELEG WG](#)
 - Currently, the DNS only provides very limited information about delegations. DELEG extends the DNS to provide more information, such as child server's support for DNS-over-TLS, Alias domains, etc.
- New group on Domain Connect
 - [DCONN](#) is an application-level protocol that enables Software Service Providers (e.g., hosting) to request configuration of required DNS records in their customers' zones in a DNS provider
- Extensions to EPP and Maintenance of RDAP (see [REGEXT](#))
- JSON/REST based RDAP-like protocol (see [RPP](#))
- Standardizing the Domain Connection Protocol ([DCONN](#))

IETF

Selected Work on AI

- [AI Preferences](#) (aipref)
 - Working on building blocks for the expression of preferences about how content is collected and processed for Artificial Intelligence (AI) model development, deployment, and use.
- [Web Bot Auth](#) (webbotauth)
 - To work on cryptographic identity for bots as non-browser traffic on the Web grows and traditional techniques such as User-Agent, IP addresses become less effective.
- For the AI datacenter
 - Energy efficiency metrics ([GREEN](#)), Routing protocols (e.g., [RIFT](#), [LSVR](#)), Improved identity of workload ([WIMSE](#))
- Engaged on the ITU AI Standards Exchange

IAB Workshops

Dec-2025: IAB Workshop on IP Address Geolocation (Virtual)

- Initial report [posted](#)
- Recordings: [Day 1](#), [Day 2](#), [Day 3](#)
- IP is a weak and overloaded signal for geolocation
- Many operational issues - Anycast, Satellite, overlays...
- Need for signaling intent, certainty and consent
- Scope for incremental updates for IP geo but cannot meet high-assurance or privacy-sensitive needs

Oct-2025: IAB/W3C Workshop on Age-Based Restrictions on Content Access

- Initial draft report [posted](#)
- No single one-size-fits-all technical solution: different use cases imply different trade-offs, and network-layer solutions alone are insufficient.
- Strong privacy and trust concerns
- These mechanisms can have long-term impacts on Internet architecture

Internet Research Task Force (IRTF)

Research Activities

Recently Started research groups

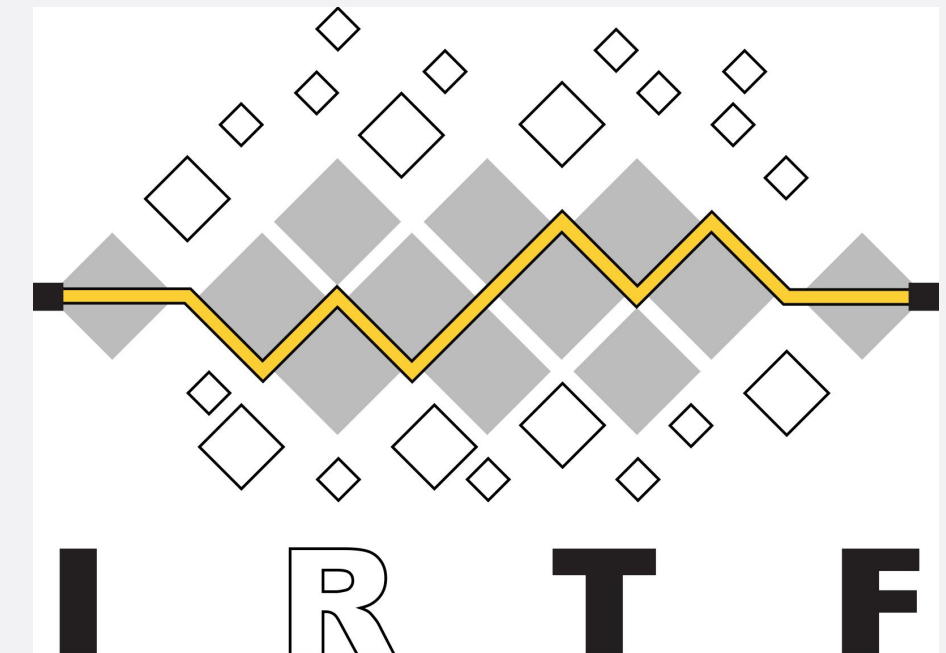
- [Sustainability and the Internet](#) (SUSTAIN RG)
- [System & Protocol Aspects for Circumstellar Environments](#) (SPACERG)

Example policy-focused research groups

- [Human Rights Protocol Considerations](#) (HRPC)
- [Global Access to the Internet for All](#) (GAIA)

Long running research groups

- [Quantum Internet Research Group](#) (QIRG)
- [Path Aware Networking Research Group](#) (PANRG)
- [Decentralization of the Internet](#) (DINRG)



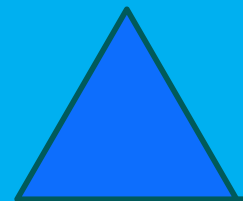
<https://www.irtf.org/>

How To Engage

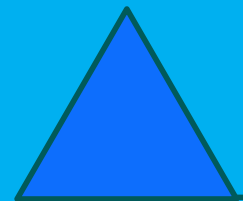
- Working groups and materials
 - **All working groups are open to anyone and free to join**
 - All working materials are freely available online
 - Most work is conducted online
- Meetings and events
 - **IETF plenary meetings** are held three times a year (rotating around the globe)
 - Some working groups schedule **interim meetings** at various times and places
 - **Full remote participation** is available for all meetings (since before the pandemic)
 - Open source **IETF Hackathons** are collocated with plenary meetings
- **Get started at:** www.ietf.org/participate

IETF & ICANN

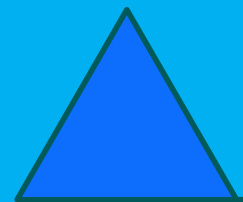
Why this matter to this community?



The stability of the Internet depends on open technical standards.



IETF develops protocols that underpin global interoperability.



IETF and ICANN serve different roles but are key partners in the Internet Ecosystem.



Discussion



<https://www.youtube.com/watch?v=UiYD0cSnBI>

「thank you.」

Backup – Will not present

IETF

Open Internet Standards

- Open standards are key to allow devices, services, and applications to **interoperate across a interconnected, heterogeneous, and global network of networks**
- The IETF process is **open, transparent**, and relies on a **bottom-up consensus-building**
- **Openness** in both the technical standards itself as well as the standards development process is the basis for **innovation** in, and on top, of the Internet and is **key to its success**.

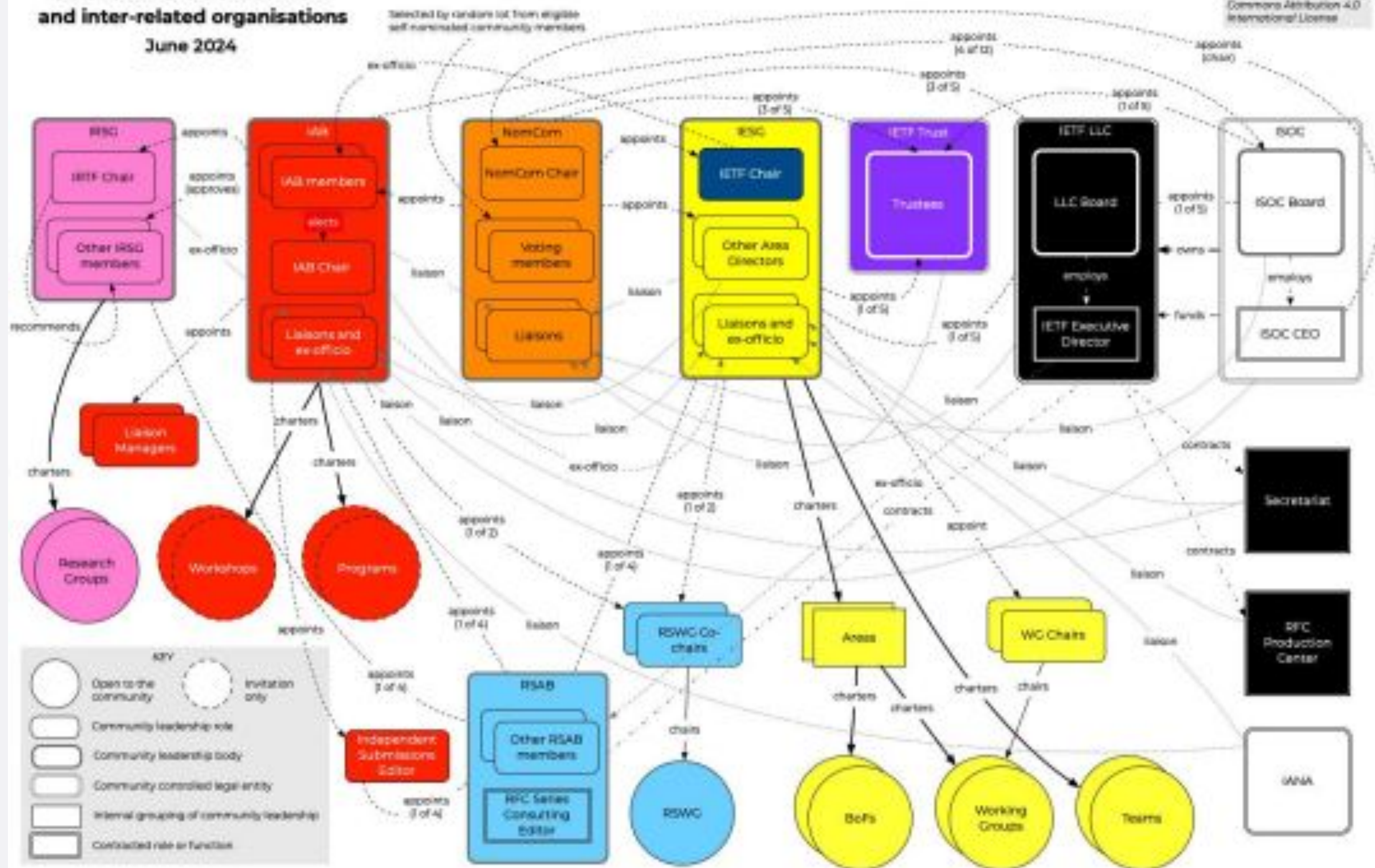
Open Internet Standards

- Open standards are key to allow devices, services, and applications to **interoperate across a interconnected, heterogeneous, and global network of networks**
 - All IETF standards are available **online at no charge**, thus facilitating adoption of them.
 - The IETF determines its success by **technical quality and voluntary deployment**
- The IETF process is **open, transparent**, and relies on a **bottom-up consensus-building**
 - **Everybody may participate**, no membership
 - All work like Internet-Drafts and email archives are **publicly available**
 - Decisions are based on **rough consensus**
- **Openness** in both the technical standards itself as well as the standards development process is the basis for **innovation** in and on top of the Internet and **key to its success**.

Structure of the IETF and inter-related organisations

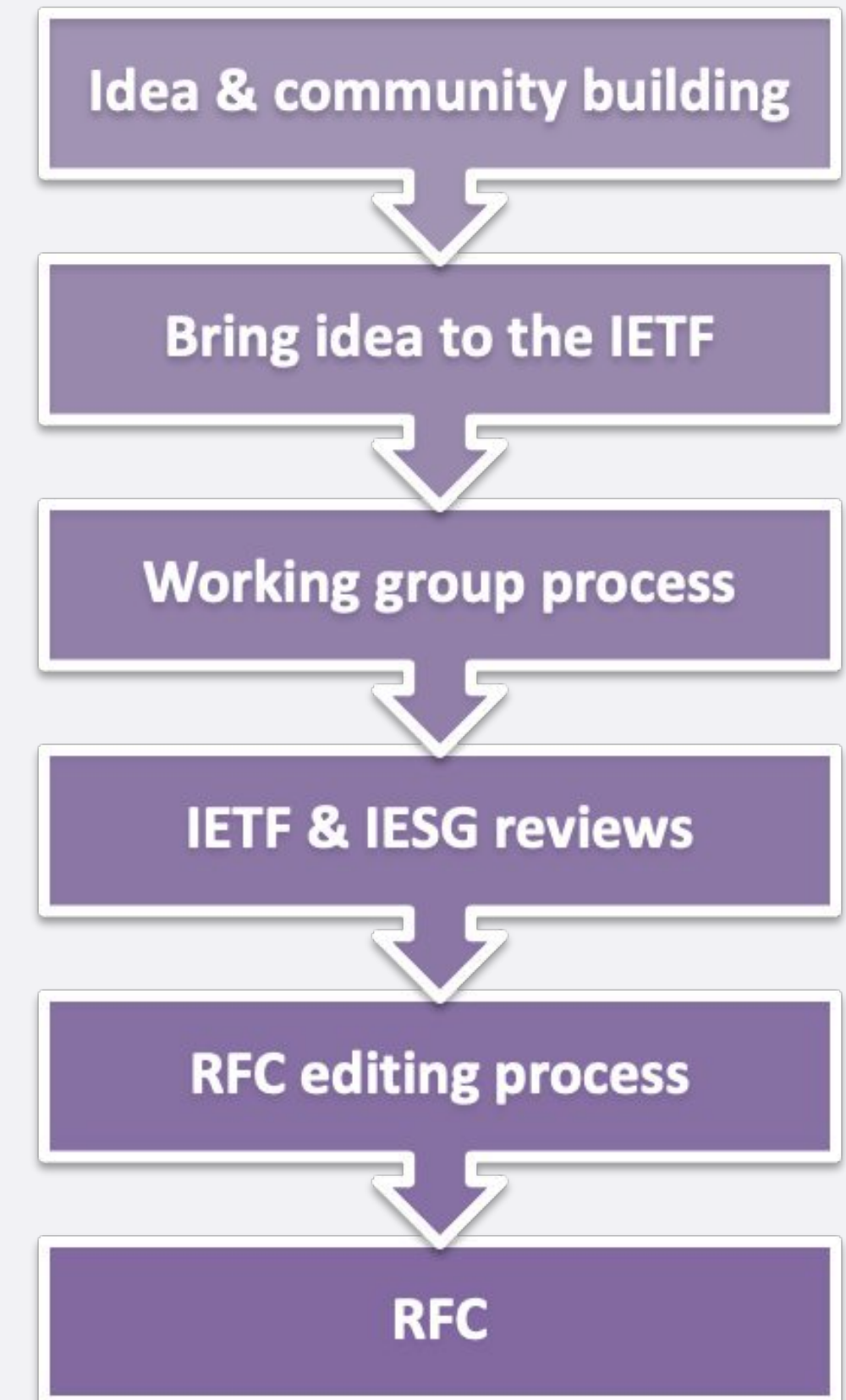
June 2024

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How New Work Starts

- **Contribution-driven**, bottom-up process
 - Participants identify a **problem that needs solving**
- The **problem fits** one of the IETF areas
 - And **aligns with architectural principles** of the Internet
- **Scope is well defined** and understood
 - Research is complete, **engineering work** is needed
 - Agreement on **timetables and milestones**
- **Willing people** to do the work
 - Typically not just initial proponents



IETF

Internet Standards & the ICANN Ecosystem

Open Standards Matter

Enable competitive and innovative digital ecosystem, support secure, resilient global interoperable infrastructure.



Benefits

Avoid vendor lock-in and single dependency, reach for global markets, interoperability, innovation at Internet scale.



In relations to ICANN

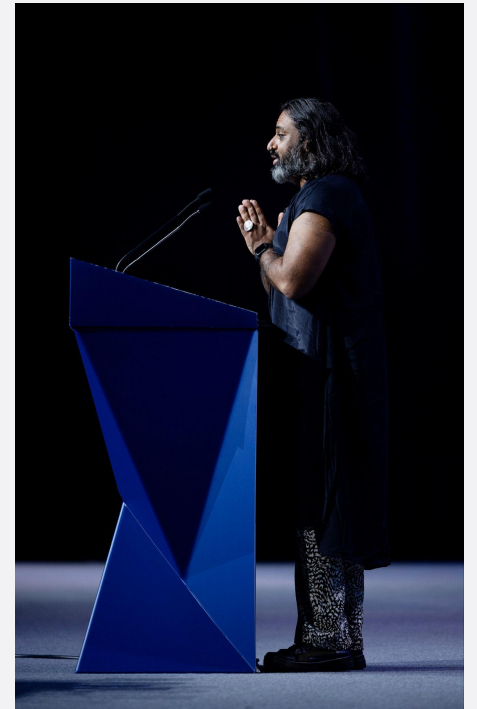
Underpins DNS stability, security, resilience for a single, global, interoperable Internet.

Open standards are foundational to global interoperability, operational stability, and trust in the Internet's naming, routing, and protocols.

IAB

Internet Architecture Board

- The Internet Architecture Board provides **long-range technical direction** for Internet development, ensuring the Internet continues to grow and evolve as a platform for global communication and innovation.
 - Providing architectural guidance and early technical foresight.
- Responsibilities include
 - Architecture and Standards **Process Oversight** (including Appeal Handling)
 - **Liaison Coordination** including contact point and cooperation with ICANN, IANA, ITU-T, ISOC etc.
 - Active participation in **Internet Governance**
 - **Outreach**



Internet Architecture Board Activities



Architectural Review

Ensure architectural coherence across protocol and layers. Guidance to maintain a stable, interoperable Internet.

Future Technical Directions

Pre-standardization IAB workshops and technical programs that identify emerging issues and help bring new work into the IETF.

Principled Architectural Stewardship

Provide long-term architectural direction for the Internet and ensure that changes in protocols, naming, routing, and security mechanisms evolve coherently and sustainably by providing architectural guidance and early technical foresight.

IAB does not operate from a grand-architecture blueprint, but guided by fundamental design principles for Internet.

Governance & Process Oversight

Standards process oversight, appeals, appointments/confirmations, and responsibility relating to IETF protocol parameters managed by IANA.

Coordination & Outreach

External liaisons (including ICANN and other SDOs), advisory body to ISOC, participate in IG discussions, outreach.

Internet Architecture Board

Recent IAB Statements



- [Revision of Regulation \(EU\) No 1025/2012, also called the 'EU Standardisation Regulation'](#)
- [WSIS+20 Stakeholder Consultations: Inputs to the Zero Draft from the IAB](#)
- [IAB Co-signed Open Letter: Bill C-2 Strong Borders Act](#)
- [IAB Response to the ICANN Public Comment on "Functional Model for Root Server System Governance"](#)
- [WSIS+20 Stakeholder Consultations: Inputs to the Elements Paper from the IAB](#)
- [IAB Co-signed Joint Letter in Response to Australian eSafety Proposed Industry Standards](#)
- [IAB Statement on Encryption and Mandatory Client-side Scanning of Content](#)
- [IAB co-signed an open letter on the EU's proposed eIDAS reform](#)
- [Risks of Attestation of Software and Hardware on the Open Internet](#)
- [European Commission's exploratory consultation on "The future of the electronic communications sector and its infrastructure"](#)

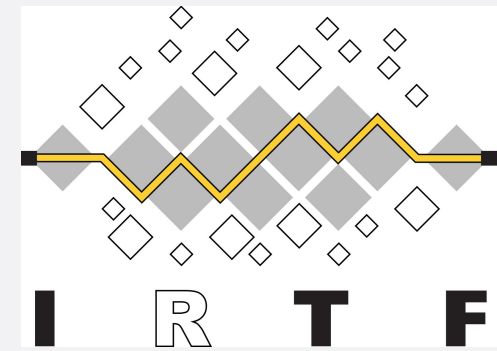
IETF

Selection of DNS-focused activities in the IETF

DNS Protocol	Registry / Registrar / Service Provider Protocols
• Operations (e.g., DNS maintenance, Multi-Signer, LocalRoot) • Security (e.g., cryptographic algorithms for DNSSEC) (see DNSOP) • Resolver discovery (see ADD) • Service Discovery (e.g., dnssd / mDNS, Bonjour, .local) (see DNSSD) • Adding information for improved delegations (see DELEG)	• Extension to EPP (see REGEXT) • Maintenance of RDAP (see REGEXT) • JSON/REST based RDAP-like protocol (see RPP) • Standardizing the Domain Connection Protocol (DCONN)

Internet Research Task Force

Long-Term Research & Future Internet Exploration

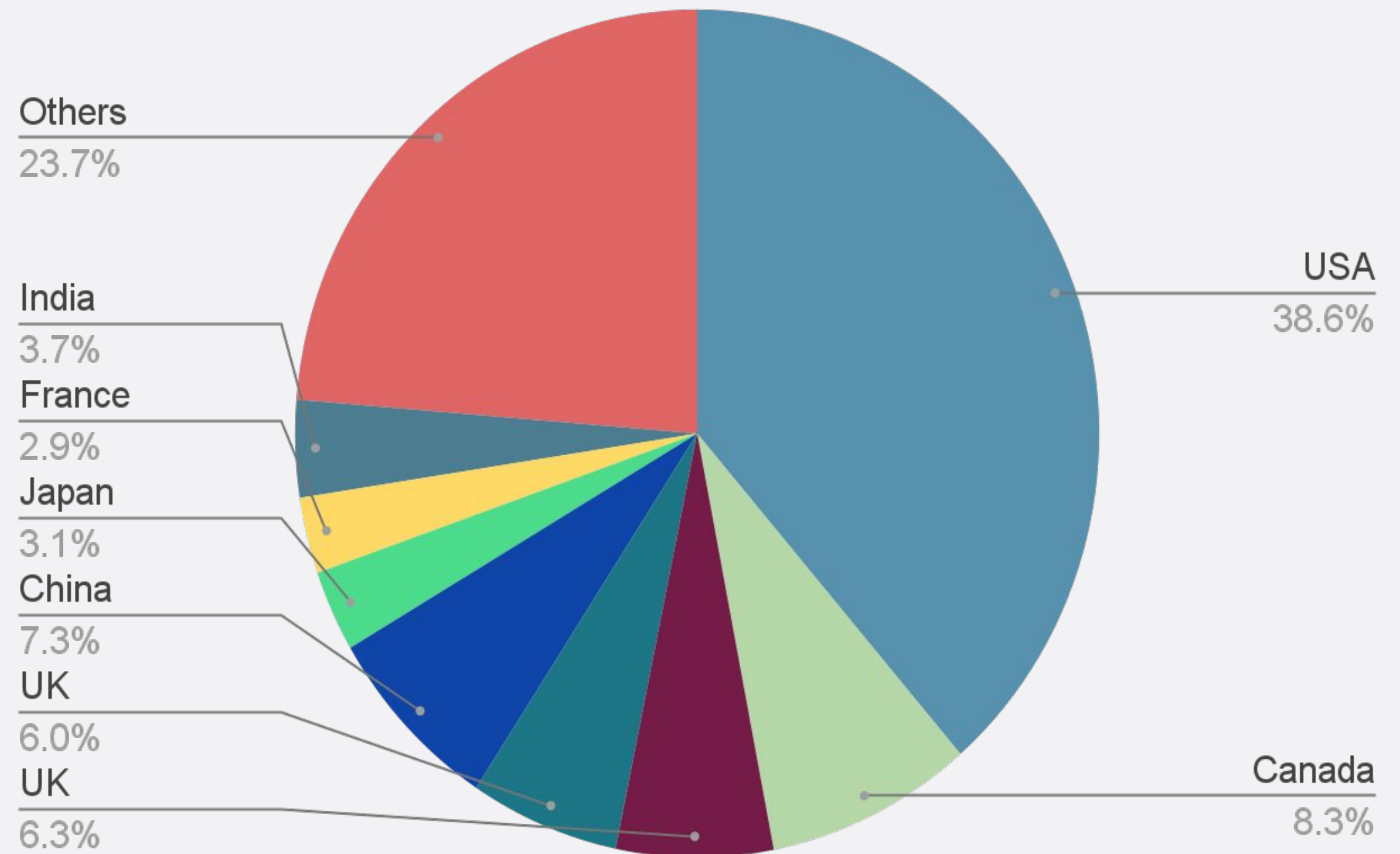


What IRTF does?	Why it Matters?
• Explores long-horizon Internet research • Works through stable Research Groups • Deeper investigation before standardization • Publishes research, experimental RFCs • Connects research with engineering & standards • Applied Networking Research Workshop (ANRW) • Applied Networking Research Prize (ANRP)	• Some topics with policy relevance ○ Decentralization ○ Connecting the unconnected ○ Human Rights Protocol considerations • Supports future researchers ○ Travel Grants for PhD students, early early-career researchers, and under-represented groups • Strengthens long-term Internet viability

IETF 124 Montreal, November 2025

1791 registered participants

- **953** on-site (63% of total)
- **838** remote (37% of total)
- **21.6%** first-time participants
- **547** IETF Hackathon participants
 - **444** onsite
 - **103** remote



IETF Snapshot 2024

<https://www.ietf.org/blog/ietf-snapshot-2024>

Participants

7,831 participants in all IETF activities (mailing list posters, meeting participants, I-D authors)*

4,662 IETF Meeting participant registrations (48% remote)

244 fully online interim meetings

Documents

2,977 Internet-Drafts (I-D) submitted†

2,888 I-D authors

173 RFCs published

Messages

110,943 sent to IETF mailing lists

Individuals

2,717 posting to IETF mailing lists

Working groups

126 active Working Groups

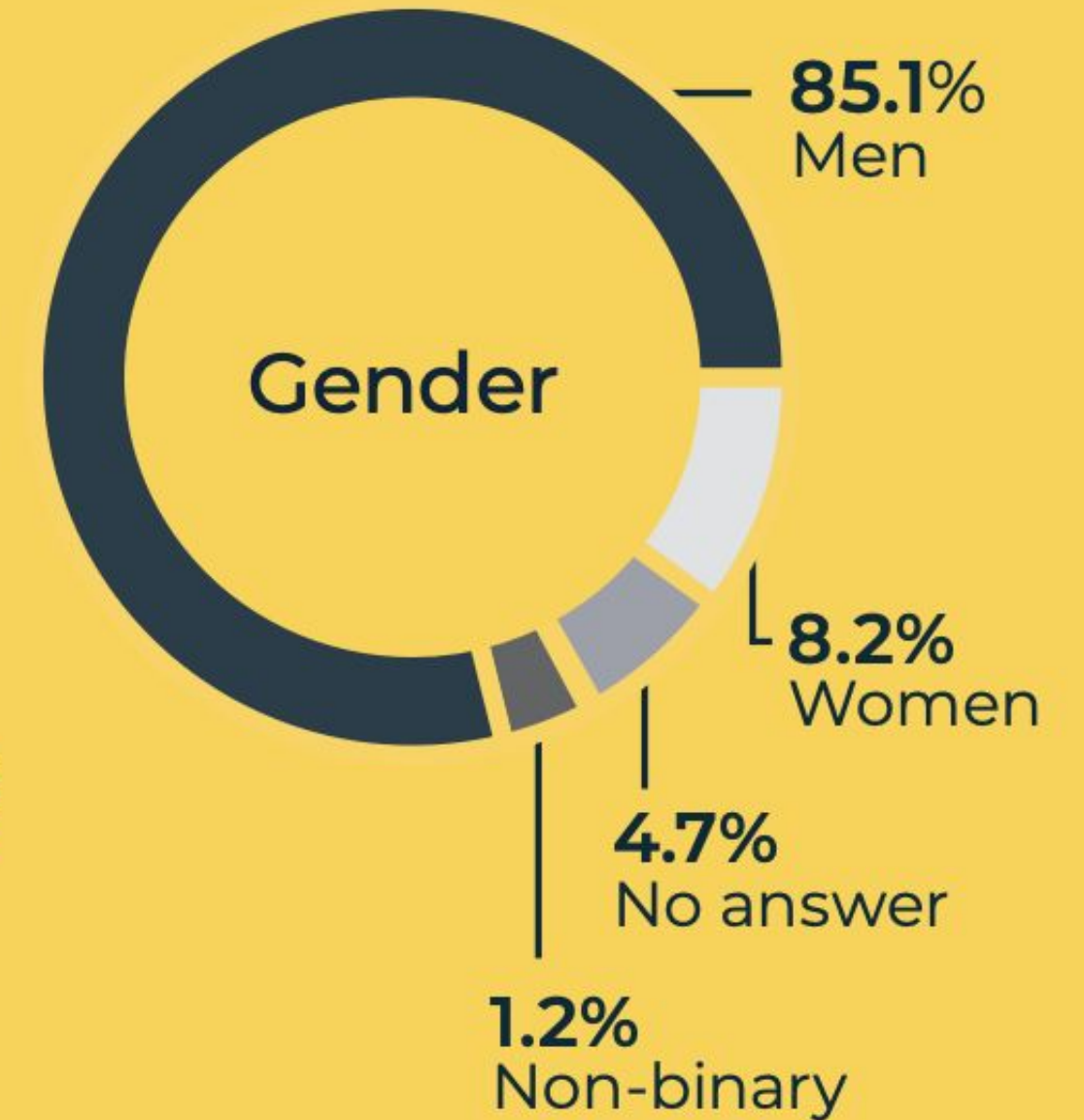
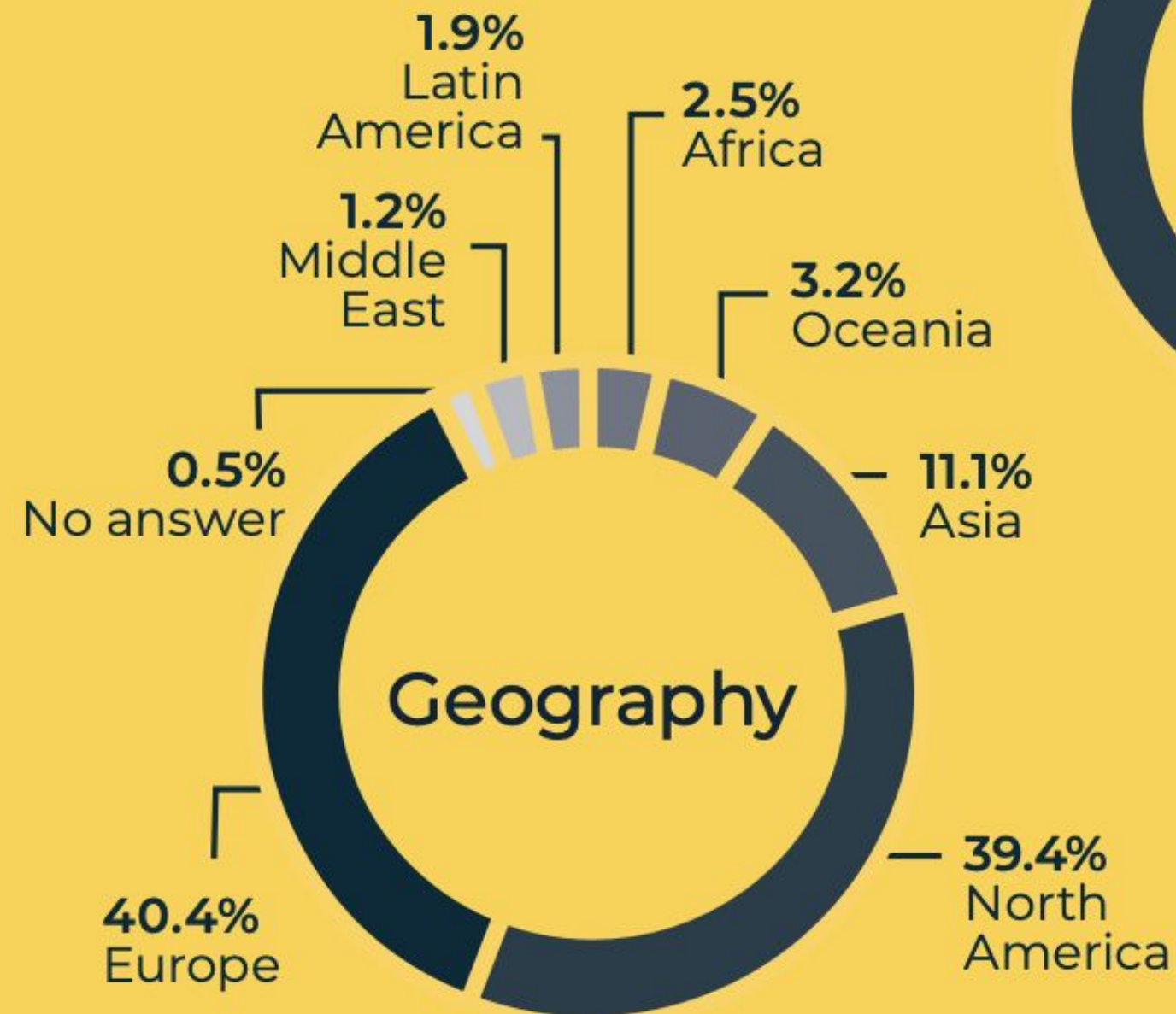
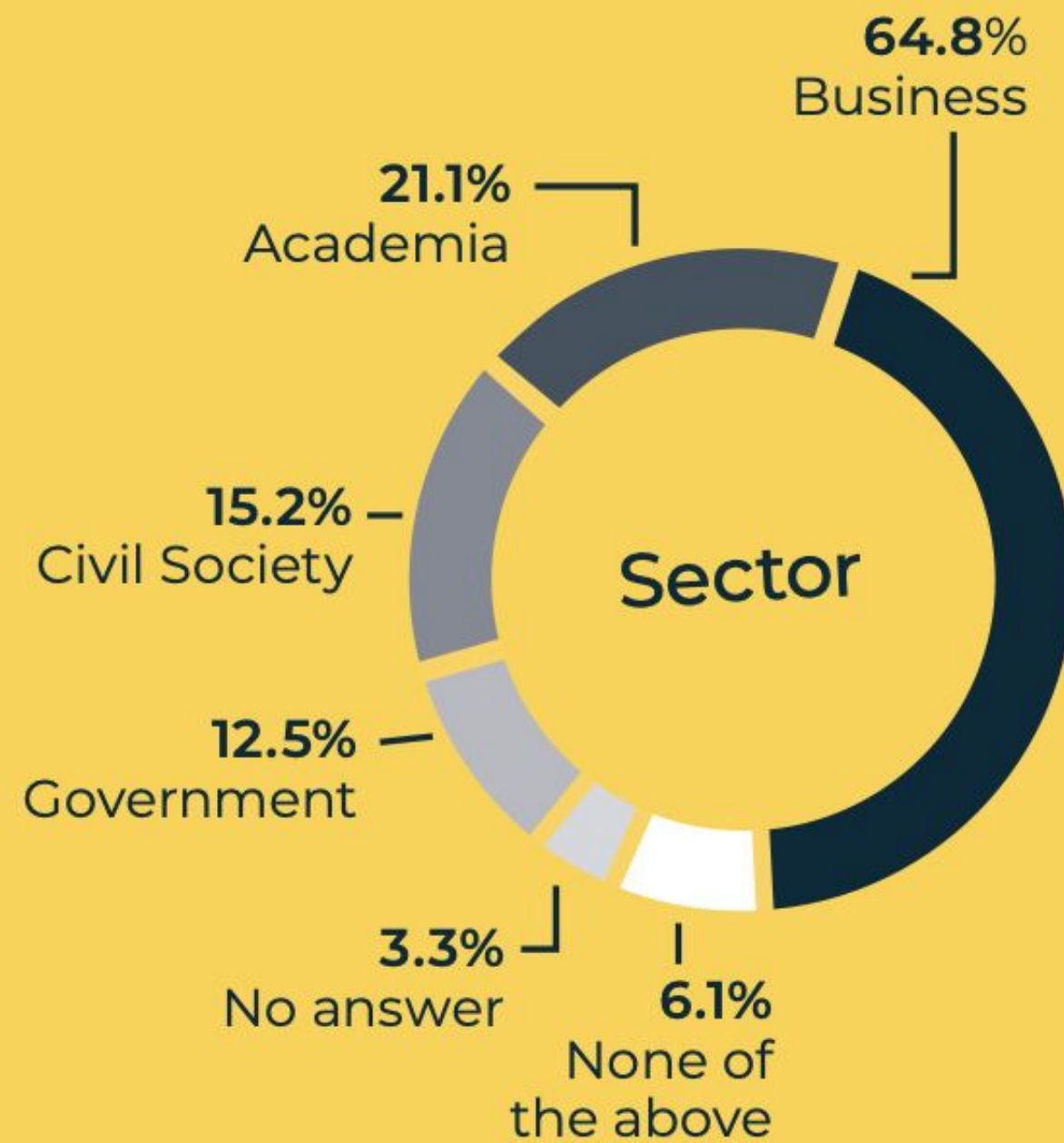
11 new Working Groups chartered during 2024

13 Working Groups concluded during 2024

* based on unique email address used to register for IETF events, submit I-Ds, and post to IETF mailing lists

† Unique I-D names not counting different versions of the same I-D submitted to the IETF I-D archives

The IETF Community



Source: 2024 IETF Community Survey

Hackathon

Where running code shines

- Held on the **weekend** before each IETF meeting, the IETF Hackathon brings the community together.
- A collaborative space to implement standards and test **interoperability** across implementations.
- **Open to all** – anyone can propose a project, anyone can join and contribute.
- Hackathon **demos** showcase progress and often shape discussions during the IETF week.
- A chance to **learn** new technologies, **connect** with global experts, and make real **contributions** to Internet standards – an outstanding opportunity for students and researchers.

• <https://www.ietf.org/how/runningcode/hackathons/>